

Learning to Use Public Health Services Data

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Binder Information

- Workshop I:
 - Copy of all slides presented
 - Database information sheets
 - Quick reference slides: who, what, when, where
 - Index (databases by topic)
 - For each topic/indicator, see page number for relevant databases
 - Page number of primary data sources in bold
 - i.e. want data on diabetes:
 - See databases: Hospital, ED, Death, CHIS, YRBS
- Workshop II:
 - Copy of all slides presented

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Agenda

- Data - Definitions
- Asking Questions to Find Data
- Data Measures
 - Choosing, Analyzing, Interpreting, Presenting
- Special Considerations
- Health Indicators
- SMART Objectives
- Program Evaluation

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Learning Objectives

- To understand the different ways to find and use data.
- To be able to ask the right questions about data.
- To understand the importance of planning ahead.
- To understand the basic components of a SMART objective.

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Why Do We Need Data?

- Data is essential to
 - Assess and monitor health problems
 - Understand the extent of the problem
 - Identify target populations
 - Diagnose and investigate health hazards
 - Implement and evaluate educational programs
 - Develop comprehensive policies
 - Establish priorities
 - Administer community-wide services
 - Plan for emerging health issues
 - Compare to other communities, states, etc..

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How We Use Data

- Education
- Policy
- Grants
- Performance Measures
- Program Evaluation
- Prevention Activities

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Quantitative vs. Qualitative Data

Quantitative:

- Collected in the form of numbers or percentages
- Closed-ended questions
- Answers who?, what?, when? and where?
- Can demonstrate cause and effect
- Can "represent" a population
- Cannot collect new ideas or responses, only those considered ahead of time

Qualitative:

- Collected in the form of words, concepts, themes, or categories
- Open-ended questions
- Answers how?, why?
- Can provide richer, more in-depth data
- Can provide data in a respondent's own words
- Can explore new ideas in a dynamic and unstructured way

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Definitions

• Population

- Represents the group you want to generalize to
 - Often defined in terms of demography, geography, occupation, time, care requirements, diagnosis, or some combination
- Examples
 - All residents of San Diego County during 2005
 - All females aged 15 through 54 years living in San Diego County during 2007

• Sample

- Subset of a population
- Size is usually smaller than the size of the population

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Types of Databases

• Population-based

- Virtually everyone with the illness/injury is included
 - Within a specified location, i.e. State, County, Municipality
 - Meeting the database criteria
- Inclusion varies by database
- Examples: hospitalization, ED discharge, birth data, death data
 - Not everyone goes to the hospital or to the ED in a given time period
 - Not everyone is born or dies in a given time period

• Service or Use Data

- Client data
 - Results apply to your service population
 - May not apply to all population with specific illness/injury
- Examples: Alcohol & Drug Services, HIV testing, immunization,
 - Only those who seek out the service are included

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Types of Databases

• Sample Data

- Statistical sample
 - Representative of the population
 - Results can be applied to the population
- Convenience sample
 - Not representative of the population
 - Easy to obtain
- CHIS, YRBS

• Survey Data

- Carefully crafted questions on a topic or issue
- Purpose is to reveal information about community residents or the services they utilize.
- Survey results are usually based on sample data
 - Statistical or convenience sample
 - Exception: Census data
- CHIS, YRBS, 10-year Census

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Types of Databases

• Useful Non-Health Data

- Population Data
 - Demographic, economic, housing, land use, social characteristics
 - SANDAG, California DOF, Census
 - Useful in conjunction with public health data
 - Calculation of rates
 - Community profiles
- Law enforcement
 - Crime data
 - ARJIS
 - Traffic crash data
 - SWITRS
- DMV
 - Licensed drivers

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What database might this person be in?

• Useful Non-Health Data

- SANDAG
- ARJIS
- SWITRS

• Population Data Sources

- Vital Records
 - Birth Certificates
 - Death Certificates
- Medical Care Data
 - Prehospital
 - Emergency Dept
 - Trauma
 - Hospital Discharge
 - Medical Examiner

• Service Data

- Behavioral Health Services
 - Alcohol and Drug
 - Mental Health Services

– Morbidity

- Immunization
- HIV Testing
- HIV/AIDS Reporting
- STD
- TB
- Lead
- Other Reportable Diseases

• Survey (Sample) Data

- CHIS
- YRBS

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Asking the Right Questions to Find the Right Data

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Why It's a Good Idea to Plan Ahead for Data Analyses

- To determine if the data you collect are practical for analyses
- To find available data that meets your time frame
- To review the appropriateness of your chosen data collection method(s)
- To develop the data collection instrument
- To decide if you will need help with analyses

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What is Your Purpose?

- What are you trying to accomplish?
 - Identify a new problem?
 - Measure a known problem?
 - Identify high-risk populations or groups?
 - Establish a measurable baseline for a specific issue or program?
 - Develop a measurable objective for a specific issue or program?

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Gathering Information

- Disease/Injury
 - Specific definition
- Age
- Gender
- Race/ethnicity
- Geographic location
- Severity
 - i.e. Death vs. Hospitalization
- Key contributing factors

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Gathering Data

- Definition of Disease/Injury
 - How was this disease or injury defined?
- Time Period
 - What time period does the data represent?
- Definition of Population
 - Who does this data represent?

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Go Back to Your Purpose

- Be sure to analyze only the data that will help you answer your key question(s)
- Don't get side-tracked into analyzing other pieces of data with your limited time and resources
- It is normal to collect more data than you will need for your analysis
- You can return to any other interesting data after completing your analysis

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What do you want your data to describe?

- Which data?
 - Deaths due to heart disease?
 - Death data
 - Hospitalizations due to heart disease?
 - Hospital discharge data
 - Prevalence information?
 - CHIS
- What measure is most appropriate?
 - Frequency (count)?
 - Percent?
 - Rate?
 - Is age adjusted more appropriate?
 - Mean or Median?
 - Do you need the “average” age?

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Comparing Data

- Use caution when exploring data from multiple sources or analysts
- Important elements to consider:
 - Data source
 - Data preparation (including local vs. state level)
 - Diagnosis/case definitions
 - Rate constant (i.e., per 100,000 or per 10,000)
 - Population data source (i.e., Census vs. SANDAG vs. CA DOF)
 - Geographic unit
 - Persons included in the data:
 - Residence vs. Occurrence
 - Live births vs. Total pregnancies
 - ED discharges vs. all ED visits

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Disease Diagnosis

- Disease definitions for most indicators are based on ICD-CM coding.
 - ICD-CM: International Classification of Diseases – Clinical Modification
 - Two versions currently being used
 - ICD-9
 - ICD-10
 - Caution should be used when comparing ICD-9 coded data to ICD-10
- Other indicators may be based on case definitions, meeting specific clinical and/or laboratory criteria.

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ICD-9 vs. ICD-10

- ICD-9-CM
 - Used for morbidity data
 - Hospitalization, ED discharge
 - Reported by primary diagnosis at the time of discharge
 - Important to specify how your disease of interest is defined in terms of ICD-9-CM codes
- ICD-10-CM
 - Used for mortality data
 - Death data
 - Categorized only by underlying cause of death (disease or injury that initiated the chain of events)
 - Example: A diabetic who dies of heart disease resulting from complications of diabetes would only be included among diabetes-related deaths.

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What disease are you asking for?

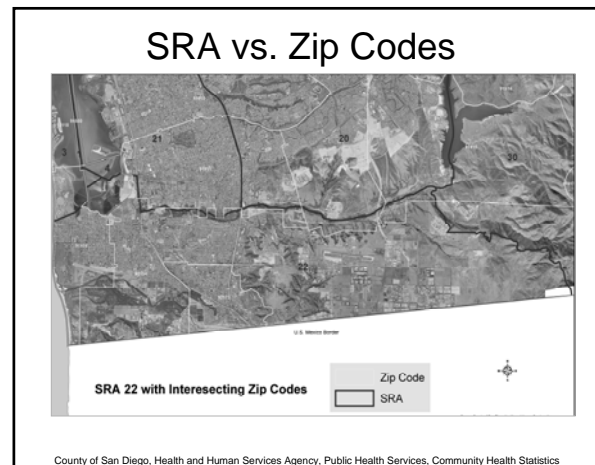
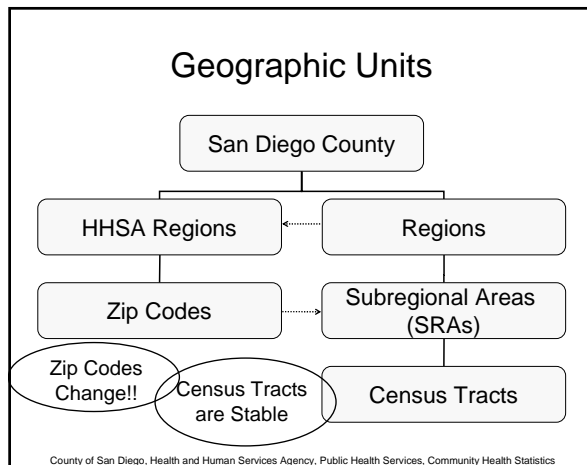
- Diseases of the heart include (ICD-10-CM):
 - Acute rheumatic fever (I00-I02)
 - Chronic rheumatic heart diseases (I05-I09)
 - Hypertensive heart disease (I11)
 - Hypertensive renal disease (I13) “Heart Disease”
 - Ischaemic heart diseases (I20-I25)
 - Pulmonary heart disease (I26-I28)
 - Pericardium (I30-I32)
 - Endocardium (I33-I39)
 - Myocardium (I40-I41)
 - Cardiomyopathy (I42-I43)
 - Electrical conduction system of the heart (I44-I49)
 - Other (I50-I51)

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Geographic Units

- Small level geographic analysis
 - Zip code
 - Health/Service data
 - Good for service data
 - Bad for trends (changes over time)
 - Subregional Area (census tracts)
 - Population data from census
 - Bad for service data
 - Good for trends (stable over time)

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Data Measures

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- ### Choosing Measures
- Which data do you use?
 - Deaths due to heart disease?
 - Death data
 - Hospitalizations due to heart disease?
 - Hospital discharge data
 - Prevalence information?
 - CHIS
 - What measure is most appropriate?
 - Frequency (count)?
 - Percent?
 - Rate?
 - Is age adjusted more appropriate?
 - Mean or Median?
 - Do you need the “average” age?
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- ### Data Measures
- Mean
 - “Average”
 - Used with continuous data
 - To calculate:
 - Add all values together
 - Divide by the number of cases
 - Example:
 - Mean age
 - $34 + 27 + 56 + 54 + 27 = 198 / 5 = 39.6$ years
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- ### Data Measures
- Median
 - Middle number
 - To calculate:
 - Line values up in ascending order
 - Choose the middle number
 - If you have an even number of values, take the average of the middle two.
 - Example:
 - Median age
 - $27, 27, 34, 54, 56 = 34$ years
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Data Measures

- Mode
 - Most frequently occurring number
 - To calculate:
 - Line values up in ascending order
 - Choose the most commonly occurring number
 - You can have no mode or more than one mode
 - Example:
 - Mode of age
 - 27, 27, 34, 54, 56 = 27 years

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Data Measures

- Range
 - The distance between the largest and the smallest numbers in the data
 - To calculate:
 - Line values up in ascending order
 - Subtract the smallest value from the largest value
 - Example:
 - Range of age
 - 27, 27, 34, 54, 56 = $56 - 27 = 29$ years

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Data Measures

- If you are asked, “what is the average age?”, how do you respond?
 - Average is often associated with mean, but is it the most appropriate measure?
 - Example, suppose your sample consists of 12 people of the following ages:
 - 24, 24, 25, 25, 25, 25, 25, 25, 27, 27, 27, 29, 96

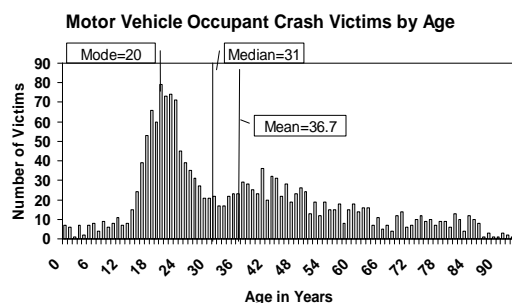
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Data Measures

- 24, 24, 25, 25, 25, 25, 25, 25, 27, 27, 27, 29, 96
 - Range: $96 - 24 = 72$ years
 - Mean: $382 / 12 = 32$ years
 - Median: 25 years
 - Mode: 25 years
- What measure should be used?
 - Mean is affected by outliers
 - Outlier – a value far from most others in a data set.
 - The person who is 96 years is an outlier.
 - Median and Mode are more appropriate measures of “average” age.

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Mean, Median and Mode



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Data Measures

- Frequency
 - A count of how many times an event occurred
 - Advantage
 - Answers the question of “how many”
 - Disadvantage
 - Cannot directly compare the number of injuries to other groups
 - Example
 - There were 369 nonfatal hospitalizations for pedestrian injuries in San Diego County in 2004

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Data Measures

- **Percentage**
 - Represents the proportion of cases out of 100
 - Total will add to 100%
 - **Advantage**
 - Describes the frequency by group within a whole
 - **Disadvantage**
 - Does not tell how many
 - Does not control for population size, so can't compare to other populations or over time
 - **Equation**
 - Percent = $\frac{\# \text{ in group}}{\text{total \#}} \times 100$
 - **Example:**
 - $\frac{129 \text{ HIV+ tests to Whites}}{290 \text{ total HIV+ tests}} = 0.445 \times 100 = 44.5\%$

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Data Measures

- **Rate**
 - Frequencies that have been converted to proportions sharing a common denominator
 - **Advantage**
 - Is a standardized measure
 - Easier to compare disease frequency across different populations and time periods.
 - **Disadvantage**
 - Does not tell how many
 - **Equation**
 - Rate = $\frac{\# \text{ illness/events in a specific population}}{\text{total \# of specific population}} \times \text{Constant}$
 - **Example**
 - $\frac{196 \text{ AIDS cases for Whites}}{1,577,029 \text{ Whites in population}} \times 100,000 = 12.4 \text{ per } 100,000$

Constant = 1000,
10,000 or 100,000

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Data Measures

- **Types of rates**
 - **Crude rate**
 - A rate that applies to the population as a whole
 - **Age-specific rate**
 - A crude rate measured within a specific age group
 - **Age-adjusted rate**
 - A rate that is standardized to a distribution of the population by age group

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Rate Calculations

- Fall hospitalizations in Healthy County, 2001
 - 0-4 yr olds: 250 per 180,000 population
 - 5-9 yr olds: 240 per 165,000 population
- Calculating only the proportion is hard to interpret:

$$\frac{250}{180,000} = 0.0013889$$

$$\frac{240}{165,000} = 0.0014545$$
- Need to convert to "events per a common population"

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Rate Calculations

- **Three components:**
 - Number of injuries per time period (numerator)
 - 250 fall hospitalizations in 2001 among 0-4 year olds
 - 240 fall hospitalizations in 2001 among 5-9 year olds
 - Size of the population (denominator)
 - 180,000 0-4 year olds in 2001
 - 165,000 5-9 year olds in 2001
 - Constant
 - usually 100,000 for public health data

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Rate Calculations

- **Rate Formula**

$$\frac{\# \text{ of events in the population per time period}}{\# \text{ of people in the population per time period}} \times \text{Constant}$$
- **Example**

$$\frac{\text{Number of hospitalizations due to falls, 0-4 yrs, 2001}}{\text{Total population, 0-4 yrs, 2001}} \times 100,000 =$$

$$\frac{250}{180,000} \times 100,000 = 138.9 \text{ per } 100,000$$

$$\frac{\text{Number of hospitalizations due to falls, 5-9 yrs, 2001}}{\text{Total population, 5-9 yrs, 2001}} \times 100,000 =$$

$$\frac{240}{165,000} \times 100,000 = 145.5 \text{ per } 100,000$$

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Rate Interpretation

- The interpretation of a rate can be written in multiple ways:
 - For every 100,000 children aged 0-4 years in Healthy County, 139 were hospitalized due to a fall injury in 2001.
 - The rate of hospitalization due to falls among 0-4 year olds was 138.9 per 100,000 in 2001.
 - In 2001, there were 139 hospitalizations due to falls per 100,000 children ages 0-4 years in Healthy County.

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Data Measures

- Percentage Rate**
 - Represents the proportion of cases per 100 (will not add up to 100)
 - Advantage**
 - Is a standardized measure
 - Can compare disease frequency across different populations and time periods
 - Disadvantage**
 - Does not tell how many
 - Difficult to compare for large populations with small numbers of events
 - Equation**
 - Percent rate = $\frac{\# \text{ illness/events in a specific population}}{\text{total \# of specific population}} \times 100$
 - Example:**
 - $\frac{129 \text{ HIV+ tests to Whites}}{7,197 \text{ total HIV tests to Whites}} = 0.018 \times 100 = 1.8\%$

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Frequency, Percent or Rate?

- Frequency** tells you how many (shows magnitude)
 - i.e. From 2000 through 2004 in San Diego County, 30 children aged 0 to 4 years died as the result of drowning.
- Percents** tell you a proportion of the whole.
 - i.e. From 2000 through 2004 in San Diego County, 47% of deaths due to unintentional injury among 0 to 4 year olds were the result of drowning.
- Rates** tell you how many per a given population and allow you to compare year to year or group to group.
 - i.e. From 2000 through 2004 in San Diego County, the rate of drowning deaths among 0 to 4 year olds was 2.9 per 100,000, compared to 2.6 per 100,000 in Spring County during the same time period.

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Frequencies, Percents, Rates

Cancer Deaths, San Diego County	1994	2004
Count	4,375	4,733
Percent	0.17%	0.16%
Total Population	2,610,994	3,024,720
Crude Rate*	167.6	156.5 (6.6% decrease)
Age-Adjusted Rate*	206.7	173.9 (15.9% decrease)

*Rates per 100,000 population

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Frequency or Rate?

- Which County has a greater need for motor vehicle safety interventions?
 - Number of deaths:**
 - Summer County: 800 deaths due to MVC
 - Winter County: 500 deaths due to MVC
 - County populations:**
 - Summer County: 2,000,000 people
 - Winter County: 800,000 people
 - Rate of MV deaths:**
 - Summer County: 40.0 per 100,000
 - Winter County: 62.5 per 100,000

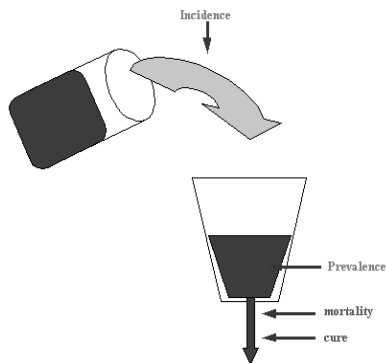
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Definitions

- Incidence**
 - The number of *new* events in a given population during a given time
 - Where we get incidence data: legally reportable disease (new cases), medical service encounters, survey.
 - i.e. "In ___(year), there were ___(number) of new cases of ___(disease)".
 - Example: A total of 27 women were diagnosed with breast cancer in Healthy County in 2005.
- Prevalence**
 - The total number of events in a given population at a given time
 - Where we get prevalence data: disease registry, survey, legally reportable disease (usually a disease that lasts, not acute episode)
 - i.e. "In ___(year) there were ___(number) of people with ___(disease)"
 - Example: A total of 213 women were living with breast cancer in Healthy County in 2005.

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Relationship Between Incidence and Prevalence



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Incidence or Prevalence?

- Example 1:
 - Based on the results of a local survey, in 2006 there were 367 persons ages 65 years and older living in Spring County who were survivors of a broken hip.
 - In 2006, 32 people aged 65+ years were hospitalized due to a broken hip.
- Example 2:
 - CHIS (2005) estimates that 16% of Spring County children aged 0 to 17 years have been diagnosed with asthma by a healthcare provider during their lifetime.
 - A survey of local physicians estimates that 246 children aged 0 to 17 years were diagnosed with asthma in 2005.

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Analyzing Data

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Analyzing Data

- Determine how you want to use the data
 - Compare averages, frequencies, percentages, rates
 - Compare data from different populations
 - County vs. County
 - County vs. State
 - State vs. US
 - Compare data from different segments of a population
 - Male vs. female
 - African American, white, Latino, Asian, American Indian, etc.
 - Children, teens, adults, seniors
 - Clientele of your program vs. those who are not
 - Different income or health insurance levels
 - Married vs. single
 - Smokers vs. not

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Analyzing Data

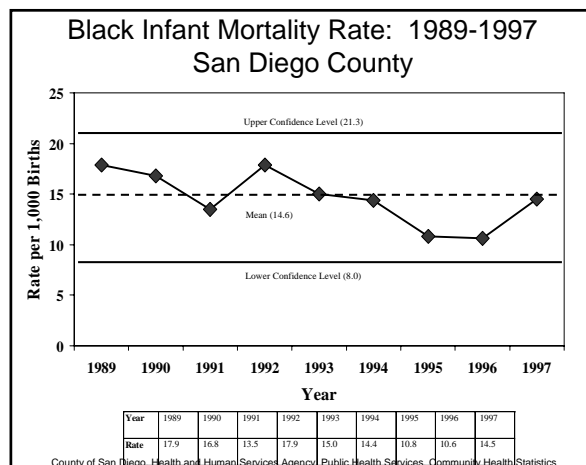
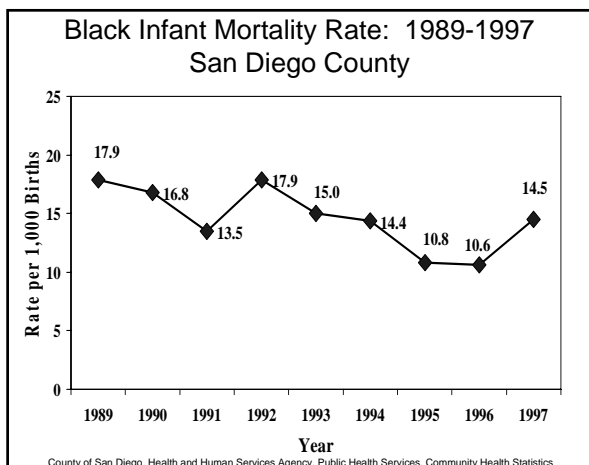
- Determining statistical significance
 - All health data has inherent variability from year to year
 - Variability is based mostly on number of events
 - Are the differences due to chance?
 - A small number of events increases the variability
 - What is a small number of events?
 - Two Methods
 - 95% confidence intervals (95% CI)
 - P-values

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95% Confidence Intervals

- 95% CI means you can be 95% sure that the true rate for that population falls within that range
 - If CIs for the groups being compared overlap, the rates are not likely to be different, if they don't overlap, they are likely different
 - Example: The mean age of all females who completed the health survey was 32 years (95% CI 27 – 35), and the mean age of males was 36 years (95% CI 34 – 40). Is the mean age significantly different between females and males?

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P-Values

- A p-value of 0.05 means a 5% probability that the observed difference occurred by chance
 - p = 0.05 is most often used, but you may also see p = 0.10 or p = 0.01
 - What does p = 0.10 mean?
 - What does p = 0.01 mean?
 - Generally used with survey or research data
 - Generated by t-test, z-test, ANOVA, etc.

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Interpreting Data and Presenting Results

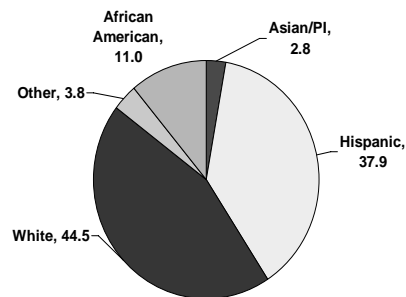
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Interpretation of Data

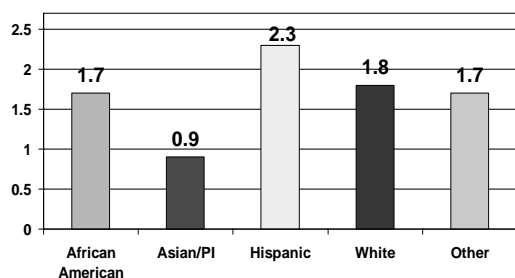
- Important questions to consider
 - Interesting results?
 - Interesting patterns or relationships?
 - Changes over time?
- Which measure do we use?
 - Mean, Median, Mode?
 - Frequency?
 - Percentage?
 - Rates?

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Percent of HIV + Tests by Race/Ethnicity, San Diego County, 2003



Rate per 100 Testing HIV+ by Race/Ethnicity, San Diego County, 2003



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Rate per 100 Testing HIV+ by Race/Ethnicity, San Diego County, 2003

Race/Ethnicity	HIV+ Tests	Total Tests	Rate HIV+ per 100	95% CI
African American	32	1931	1.7	1.1 – 2.3
Asian/PI	8	884	0.9	0.4 – 1.8
Hispanic	110	4791	2.3	1.9 – 2.7
White	129	7197	1.8	1.5 – 2.1
Other	11	653	1.7	0.8 – 3.0
Total	290	15,456	1.9	1.7 – 2.1

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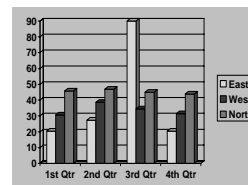
Presenting Results

- What is your message?
 - "Hispanics in San Diego County have the highest rate of HIV+ tests..."
 - "...therefore we need to target our educational outreach in the Hispanic community"
 - OR –
 - "...therefore we need additional funding to provide treatment for this community"
- Who is your audience?
 - General public vs medical personnel
- How do you reach your intended audience?
 - Use units familiar to audience
 - Example: during 1 episode of Law & Order, 11 people in California will go to ED & be discharged with an assault injury.

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Presenting Results

- Ways to present information
 - Table
 - Chart / Graph
 - Narrative



	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
East	20.4	27.4	90	20.4
West	30.6	38.6	34.6	31.6
North	45.9	46.9	45	43.9

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Presenting Results

- Present the data in different ways to see additional patterns and relationships
 - Table
 - shows averages, counts, proportions, or rates side-by-side
 - Pie graph
 - demonstrates percentages of the whole
 - Bar graph
 - compares quantities
 - Line graph
 - shows trends over time

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Definitions

- Continuous Data
 - Information that can be measured on a continuum or scale
 - Data can have almost any numeric value
 - Data can be meaningfully subdivided into categories
 - Examples: Age, weight, height, time
- Categorical Data
 - Information is sorted according to category
 - Defined number of categories
 - Categories do not overlap
 - Examples: Age groups (0-14, 15-24, 25-44, etc.), gender (male, female), marital status (single, married, divorced, widowed)

County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

Presenting Results - Tables

- Bad:

	2001	2002	2003	2004	2005
East	250	225	220	240	235
West	350	300	325	345	300
North	325	300	295	315	310
South	300	250	275	295	250

- Better:

Total Clients seen at County Main Street Clinic, FY 04/05

Division	2001	2002	2003	2004	2005
East	250	225	220	240	235
West	350	300	325	345	300
North	325	300	295	315	310
South	300	250	275	295	250
Total	1225	1075	1115	1195	1095

Source: County, Data Tables Department, 4/30/07.

County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

Presenting Results - Tables

- Title
 - Who, what, where, when
- Footnotes
 - Data source, year
 - Definition of data
 - Explanations of unusual cells/data
 - Small numbers
 - Explanation of missing data
 - Other information pertinent to the understanding of the data
- Tables should be:
 - readable and visually pleasing
 - able to stand alone

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Presenting Results - Tables

- What's wrong with this table?

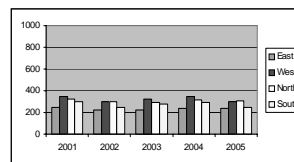
Total Clients seen at County Main Street Clinic, FY 04/05

Division & Subdivision	2001	2002	2003	2004	2005
Sub 1	50	90	65	90	61
Sub 2	100	108	100	100	80
Sub 3	50	75	100	115	100
Sub 4	150	125	100	180	100
Sub 5	100	75	120	115	200
Sub 6	85	80	80	80	60
Sub 7	88	90	81	80	85
Sub 8	88	75	63	86	60
Sub 9	88	75	98	110	95
Sub 10	81	75	74	79	78
Sub 11	114	105	103	110	103
Sub 12	130	120	118	128	124
Total	1250	1125	1135	1215	1155

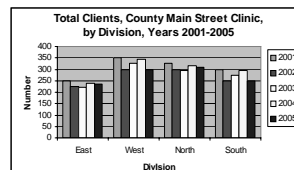
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Presenting Results - Graphs

- Bad:



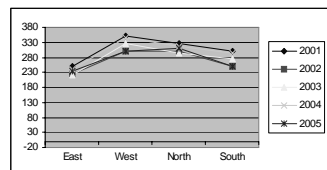
- Better:



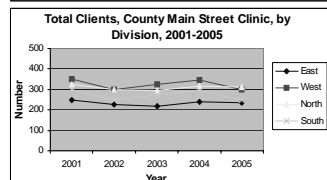
County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

Presenting Results - Graphs

- Bad:



- Better:

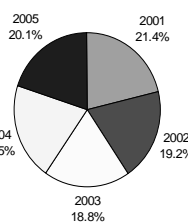


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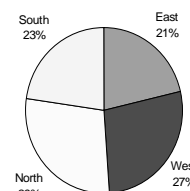
Presenting Results - Graphs

- Which graph is more appropriate?

Total Clients by Year, East Division



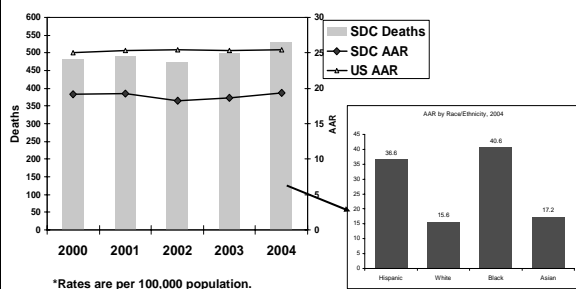
Total Clients by Division, 2005



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Presenting Results

US and San Diego County, 2000-2004



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Presenting Results - Graphs

- Title
- Footnotes
- Graphs should be:
 - Readable and visually pleasing
 - Able to stand alone
 - Appropriate
 - Bar Graph
 - Line Graph
 - Pie Chart

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Presenting Results - Narrative

- Narrative statements are written or verbal descriptions of the results of the data.
 - Highlight main points from the data
 - Overall totals, highs and lows
 - Row high, column high
 - Who, What, Where, When
 - May also include explanations or interpretations

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Presenting Results – Narrative

- “The annual rate of ED discharge was highest among the very young and the very old. Based on data for this quarter, approximately one out of every four children aged 0 to 4 years in San Diego County will have been treated and discharged from a San Diego County ED over the course of a year.”
- “The annual rate of ED discharge for 0 to 4 year olds in San Diego County decreased from 31,731 per 100,000 during the first quarter of 2006 to 25,691 per 100,000 during the second quarter. This decrease is due in part to seasonal variations in ED visits for infectious illnesses, such as acute respiratory infections.”

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Definitions

- Relative Ratios
 - Compares the rate of one event occurring to the rate of another
 - Includes magnitude (size) and direction (more/less)
 - Found by dividing one rate by another
 - Example
 - The rate of suicide among elderly men is five times greater than among elderly women.

DIRECTION

MAGNITUDE

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Putting Your Data into Perspective

- Organize your data into digestible chunks
- Use visual representations as well as text to display key findings
- Interpret data to identify prevention or intervention opportunities

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Presenting Results

- Determine what interpretations can be drawn from each finding
- Are the results similar to what you expected? If not, discuss why you think they are different
- Brainstorm alternative explanations for your results to make sure you have considered all possibilities
- Make sure the conclusions answer the original assessment questions
- Draw conclusions and recommendations that can be shared with external audiences

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Special Considerations

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Limitations

- Who's missing from data
 - Only those included in database, not everyone
 - Examples:
 - ED Data includes only those patients who were treated and discharged from the emergency department, not all patients who visited the ED.
 - Trauma registry includes only those patients for whom injuries were severe enough to require admittance to a trauma center, not all patients who suffered a traumatic injury.
- What's missing from data
 - Example:
 - ED Data does not include information on length of time in the ED.

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Limitations

- Changes in categories/classifications
 - These can occur over time
 - Example:
 - ICD9 to ICD10, collection of more than one race/ethnicity, etc.
 - May occur in the numerator but not denominator (or vice-versa)
- Changes in standards
 - Change in age adjustment from 1940 standard million to 2000.

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Limitations

- Bias
 - Any trend in the collection, analysis, interpretation, publication, or review of data that can lead to conclusions that are systematically different from the truth.
 - Examples:
 - Sponsor of study
 - Pharmaceutical sponsored study
 - Who records/codes the data
 - HIV test counselors do not ask the patient gender
 - In death data, race/ethnicity may be determined by the mortuary
 - How data is collected
 - Billing data vs. medical records
 - Accidental recording errors

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Small Numbers

- Do not calculate rates on < 5 events
 - Produces unstable rates
- Do not calculate percent change on < 20 events

Consult epidemiologist for appropriate solution!!

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The Essential Footnote

- Always document the source of your data. Include:
 - the source of the data
 - the time frame it represents
 - the name of the database
 - note on who modified data or calculated statistics
- Many databases offer suggested citation, use them

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The Essential Footnote

- Include notes on who modified the data or calculated statistics from the data
- The purpose of a footnote is to identify the source and other relevant information for the reader of your document
- The most important purpose of a footnote is to ensure that you will be able to figure out how you got the data next year when you have to reproduce it

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The Essential Footnote

Coronary Heart Disease[†] Deaths Among San Diego County Residents by Location of Residence

Year	North Coastal		North Central		Central		South		East		North Island		Unknown [‡]		County		County age-adjusted rate [§]
	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	
2000	669	143.1	863	159.3	723	146.4	869	173.6	838	189.2	321	163.2	22	---	4,552	161.8	155.1
2001	693	148.3	980	184.8	841	163.2	948	193.1	841	194.8	341	166.2	28	---	4,832	167.6	179.4
2002	673	139.3	884	120.4	876	138.9	831	153.1	850	188.4	700	137.0	23	---	4,247	148.4	162.9
2003	671	137.3	881	115.1	800	122.8	888	145.4	832	183.8	748	141.9	33	---	4,180	142.7	159.1
2004	630	125.9	889	117.4	805	120.7	859	135.2	725	159.1	723	134.1	31	---	4,019	133.4	144.4
2005																	

* Rates per 100,000 population. Age adjusted rates per 100,000 US standard population.

† Coronary Heart Disease death refers to ICD-10 codes I21, I20-I25

‡ Source: national Vital Statistics System, CDC, NCHD, Online database accessed 12/20/06: <http://wonder.cdc.gov/data2010/source.htm>.

§ Rates not calculated for fewer than 5 events. Rates not calculated in cases where zip code is unknown.

Source: Death Statistical Master Files (CA DHS), County of San Diego, Health & Human Services Agency, Community Epidemiology; SANDAG, Current Population Estimates, 9/27/06.

Prepared by County of San Diego (CoSD), Health and Human Services Agency (HHSA), Community Health Statistics, 12/12/2006.

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Ethics & Policies

- Ethical research & reporting
 - Be clear & accurate, double check
 - Be fair, reduce bias
 - Protect confidentiality
- Policies – many organizations have policies or guidelines for handling data, refer to them when available or develop them if there is none

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Health Indicators

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Health Indicators

- A health indicator defines a measure of health or a factor associated with health among a specified population.
 - Measures that guide progress toward a goal
 - Includes
 - Population (Who)
 - Disease/injury and level (What)
 - i.e. not just heart disease, but heart disease deaths or hospitalization or prevalence
 - Geographical location (Where)
 - Time period (When)
 - Amount of disease or injury (rate, frequency, percent)
 - Used in:
 - Needs assessments
 - Program evaluation
 - Routine surveillance

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Indicators of Health Status

Environmental Determinants

Indicators include: population with access to services such as potable water, sewerage and excreta disposal, levels of mercury in water, % of acceptable water analysis...

Social Determinants

Demographic Indicators
Population by age and sex, crude birth rate, fertility rate, urban population, life expectancy at birth...

Socioeconomic Indicators
Literate population (15+ years old), annual GDP growth rate, calories availability, highest 20% / lowest 20% income ratio...

Behavioral Determinants

Indicators include: Proportion of regular smokers, contraceptive use...

Health System-related Determinants

Indicators include: Human resources per 10,000 pop, immunization coverage in infants under 1 year old (%), % births attended by trained personnel...

Health Status Indicators

Perceived Health

Satisfaction: Proportion of the population 15 and over that report being dissatisfied with their social life.
Quality of life: Proportion of the population that report perceiving themselves in fair or poor health...

Objective health

Mortality
Maternal mortality, infant mortality, registered deaths from homicide, mortality rates from communicable diseases...
Morbidity
Measles incidence, confirmed dengue cases, AIDS annual incidence rate, cancer incidence rate...
Disability
Prevalence of different types of disability in a given population, average number of days per year lost to school, work, homemaking and other social roles for a defined population...

Indicator Statements

- In (When), X number of (Who) were (What) in (Where).

- In 2003, 397 children aged 0 to 14 years were hospitalized due to a playground injury in Summer County.



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Indicator Statements

- (Who) were (What) at a rate of X per (Constant) in (Where) in (When).

- Children aged 0 to 14 years were hospitalized due to a playground injury at a rate of 122 per 100,000 in Summer County in 2005.



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Health Indicator Examples

Healthy People 2010 Target: 166 heart disease deaths per 100,000 population, age-adjusted*
USA: 172 deaths per 100,000 population, age-adjusted (2003)*
California: 178 deaths per 100,000 population, age-adjusted (2003)*

Year	North Coastal		North Central		Central		South		East	
	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
2000	659	143.1	863	155.3	703	146.4	669	173.6	836	189.2
2001	693	148.3	780	138.6	651	133.2	648	163.1	881	196.8
2002	675	143.5	804	140.4	672	138.0	631	162.4	828	188.4

County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

Nonfatal Hospitalization for Unintentional Injury, 0 - 14 Years San Diego County, 2000 - 2004

	Age Groups				TOTAL
	<1	1 - 4	5 - 9	10 - 14	
Falls	205	1,038	1,296	1,012	3,551
Bicycle Related Injury	0	44	245	340	629
Struck by Object	16	111	164	369	660
Motor Vehicle Occupant	14	92	167	200	473
Pedestrian Related Injury	5	118	143	143	409
Burn - Scald	61	254	65	36	416
Poisoning	23	273	42	62	400
MV/Transport Related, Other	1	23	122	289	435
Natural/Environment	25	145	98	87	355
Cut/Pierce	2	44	53	47	146
Drowning/Submersion	4	84	24	14	126
Suffocation/Airway Obstruction	38	48	10	10	106
Firearms	0	2	3	9	14
Other	87	218	137	246	688
TOTAL	481	2,494	2,569	2,864	8,408

<http://www.dhs.ca.gov/epic/>

County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

Nonfatal Hospitalization for Unintentional Injury, San Diego County, 2000 - 2004, Ages 0 - 14 Years Morbidity Rates per 100,000

	Age Groups			TOTAL
	0 - 4	5 - 9	10 - 14	
Falls	121.1	125.2	95.1	113.6
Bicycle Related Injury	4.3	23.7	32.0	20.1
Struck by Object	12.4	15.8	34.7	21.1
Motor Vehicle Occupant	10.3	16.1	18.8	15.1
Pedestrian Related Injury	12.0	13.8	13.4	13.1
Burn - Scald	30.7	6.3	3.4	13.3
Poisoning	28.8	4.1	5.8	12.8
MV/Transport Related, Other	2.3	11.8	27.2	13.9
Natural/Environment	16.6	9.5	8.2	11.4
Cut/Pierce	4.5	5.1	4.4	4.7
Drowning/Submersion	8.6	2.3	1.3	4.0
Suffocation/Airway Obstruction	8.4	1.0	0.9	3.4
Firearms	*	*	0.8	0.4
Other	29.7	13.2	23.1	22.0
TOTAL	289.9	248.1	269.2	269.0

*Rates not calculated on fewer than 5 deaths.

<http://www.dhs.ca.gov/epic/>

SANDAG population estimates.

S:\PHS\EMS\Common\DATA\County Info\SANDAG\

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SMART Objectives

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Definitions

- **Indicator** = Point in Time
 - Measure
 - Outcome measure
- **Objective** = Indicator + Change
 - Program measures
 - Performance measures
 - Program outcomes
- Terminology may vary!!

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SMART Objectives

- **Specific** and specify what you want to achieve.
- **Measurable** and indicate what is to be measured.
- **Achievable** and attainable considering available resources.
- **Relevant** and focused on desired outcomes and results rather than methods.
- **Time-framed** to identify when or within what period the objective is to be achieved.

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SMART Objectives

- Six elements of a SMART objective statement include:
 - Quantified target (Who?)
 - Measurable indicator (What is to be done?)
 - Geographic location of persons receiving the intervention (Where?)
 - Baseline data from previous study or intervention results (a Rate or Frequency)
 - Result (To a percent or number)
 - Time frame (When will the objective be reached?)

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SMART Objectives

- The elements can be listed in any order
- It is important to write an objective that specifies outcomes
 - Who is the target population?
 - Where are they located?
 - What are you proposing to do?
 - When will the objective be accomplished?

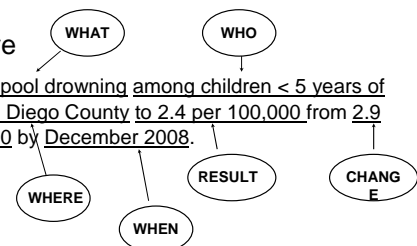
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SMART Objectives

- **Goal**
To prevent childhood injuries in San Diego County.

Objective

To reduce pool drowning among children < 5 years of age in San Diego County to 2.4 per 100,000 from 2.9 per 100,000 by December 2008.



County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

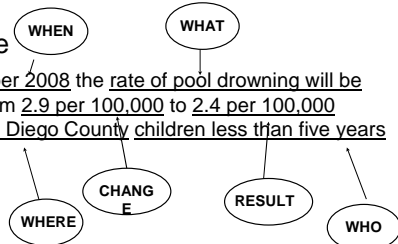
SMART Objectives

- Goal

To prevent childhood injuries in San Diego County.

- Objective

By December 2008 the rate of pool drowning will be reduced from 2.9 per 100,000 to 2.4 per 100,000 among San Diego County children less than five years of age.



County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

Nonfatal Hospitalization for Unintentional Injury,
San Diego County, 2000 - 2004, Ages 0 - 14 Years
Morbidity Rates per 100,000

	Age Groups			TOTAL
	0 - 4	5 - 9	10 - 14	0 - 14
Falls	121.1	125.2	95.1	113.6
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Drowning/Submersion	8.6	2.3	1.3	4.0
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Other	29.7	13.2	23.1	22.0
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<http://www.dhs.ca.gov/epic/>

SANDAG population estimates.

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A Data Analysis Example

County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

Shopping Cart and Stroller Injuries in Children

County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

Background

- Nationally, head injuries account for approximately two-thirds of all injuries associated with falls from shopping carts.
 - Of these, approximately 54% suffer severe injuries such as concussions and fractures.
- Mild head injuries can have significant and sustained impacts on behavior and the ability to learn.

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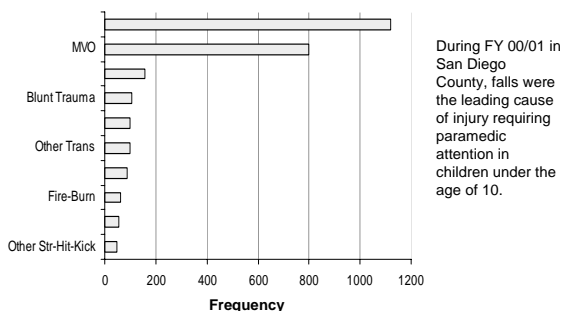
Background

- Each year almost 24,000 children ages 14 and under are treated in hospital emergency rooms for injuries associated with shopping and grocery carts.
 - 84% of these injuries occurred to children under age 5.
 - This type of injury has increased by 30% since 1985 among children under age 5.
- Less known and documented are stroller related injuries.

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Prehospital Statistics-Causes of Injury

0-9 Year Old Prehospital Patients (FY 00/01)



During FY 00/01 in San Diego County, falls were the leading cause of injury requiring paramedic attention in children under the age of 10.

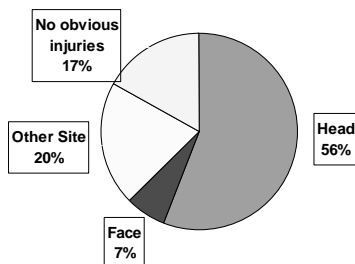
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In San Diego County

- In the San Diego County prehospital setting, an annual average of 41% of children (0-14 years old) who are transported by paramedics/EMTs have a traumatic chief complaint.
- The majority of these injuries were due to falls (29%) and motor vehicle crashes/passengers (22%).
- A more detailed look revealed that injuries involving shopping/grocery carts and strollers were quite common. This high proportion of shopping/grocery cart and stroller related injuries prompted further investigation.

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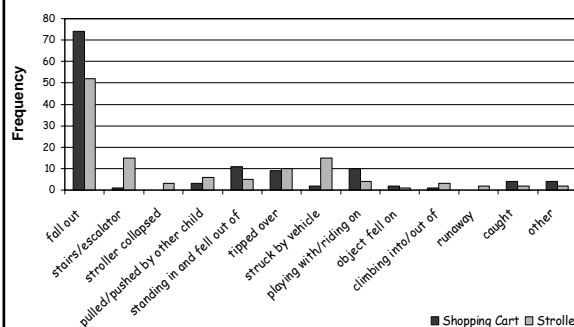
Location of Shopping Cart and Stroller Injuries



Source: County of San Diego, Health and Human Services Agency, Division of Emergency Medical Services, MICH Database, 1/99-8/02.

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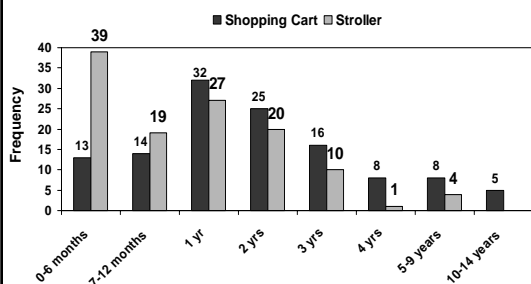
Circumstances of Shopping Cart and Stroller Injuries



Source: County of San Diego, Health and Human Services Agency, Division of Emergency Medical Services, MICH Database, 1/99-8/02.

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Types of Incident by Age



Source: County of San Diego, Health and Human Services Agency, Division of Emergency Medical Services, MICH Database, 1/99-8/02.

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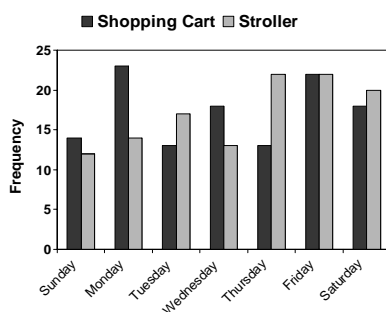
Month of Incident



Source: County of San Diego, Health and Human Services Agency, Division of Emergency Medical Services, MICH Database, 1/99-8/02.

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Day of Incident



Source: County of San Diego, Health and Human Services Agency, Division of Emergency Medical Services, MICH Database, 1/99-8/02
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When, Where and How Do Shopping Cart and Stroller Injuries Occur

- The majority were head injuries
 - 53% Stroller and 59% shopping cart
- The majority of injuries occurred during the month of May (12%).
- Friday was the most frequent day of week with lowest being on Sunday
- Of the shopping cart injuries:
 - <2% of the shopping cart injuries involved moving cars.
 - Most frequently a child fell from the cart to the floor.
- Of the stroller injuries:
 - 13% involved escalators/stairs.
 - 13% involved moving cars or trucks.

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Who is at Risk for Shopping Cart and Stroller Injuries

- Very young children and males
- Unrestrained children:
 - Only a few children injured were restrained (when known)
 - No children were reported to be restrained in a shopping cart
- At different ages there tend to be behavior patterns such as squirming, reaching and rough playing that lead to specific types of injuries.
- Unattended children:
 - According to National Safe Kids Campaign, more than 80% of parents/caregivers leave a child unattended at least once while on a shopping trip.

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Prevention Tips

- Always use safety belts to restrain your child in a shopping cart or stroller.
 - Consider bringing a harness or safety belt when shopping.
- Always stay close to your shopping cart or stroller.
- Do not let your child stand in your shopping cart or stroller.
- Never let a child push or steer the shopping cart or stroller.
- Carefully watch siblings, many injuries resulted from pushing each other or tipping the cart or stroller over.
- Don't let your child ride in the bin or under the cart.

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Conclusions

- Shopping cart and stroller incidents happen as frequently as other types of injuries that are subject to regulations and receive more public health attention.
- Although most of these shopping cart and stroller injuries were "mild" in status, the potential for severe head/neck injury exists.
- Mild head injuries can have significant and sustained impacts on behavior and ability to learn.
- Most new shopping carts and strollers are manufactured with safety straps, the challenge is to get parents to use them regularly.

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Program Evaluation Made Simple

County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

Why Evaluate?

- Funding requirements
- Improve the process
- Justification
- Documentation
- Accountability

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What to Evaluate?

- Instruments
- Questionnaires
- Processes
- Procedures
- Knowledge/Attitudes/Beliefs
- Behaviors
- Outcomes

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Evaluation Planning

- Objective: What is the question?
- Describe the target population
 - Also control group
- Describe type of information to be evaluated
- Choose specific methods
 - Quantitative/qualitative
 - Data collection strategies
- Design and test instruments

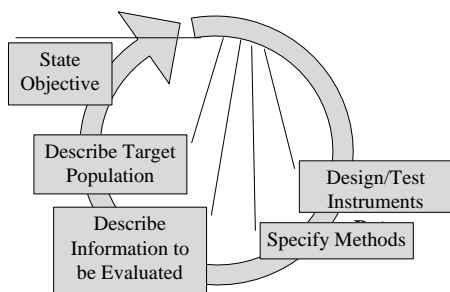
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Evaluation – completing the cycle

- Collect raw information
- Process data
 - Enter/code/clean data
- Analyze data
 - Frequencies, crosstabs
 - Statistical testing
- Report

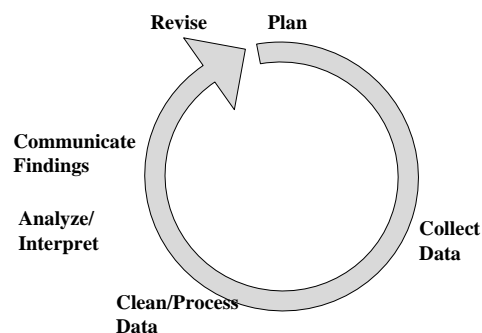
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Evaluation Cycle



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Evaluation Cycle



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Stages of Evaluation

Formative Evaluation	Process Evaluation	Impact Evaluation	Outcome Evaluation
•Pilot tests	•Participation	•Knowledge	•Morbidity
•Materials	•Penetration	•Attitudes	•Mortality
•Strategies	•Cost	•Beliefs	
•Messages	•Satisfaction		
Before Intervention	During Intervention	After Intervention	

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Program Evaluation

- For more information on program evaluation:
 - www.cdc.gov/eval/framework.htm

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Conclusions

- Data - Definitions
- Asking Questions to Find Data
- Data Measures
 - Choosing, Analyzing, Interpreting, Presenting
- Special Considerations
- Health Indicators
- SMART Objectives
- Program Evaluation

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Role of the Community Health Statistics (CHS) Unit

- “One Stop Shop” for health data
- Data Requests (619) 285-6479
- CHS Unit Website:
 - www.sdhealthstatistics.com

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FINDING DATA on the county website

- All Public Health Services pages (repeat from workshop I)
- Community Health Statistics Unit – Online Community Profiles

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Navigating County of San Diego Web

- Go to your favorite, easy to remember County site
 - i.e. www.sdhealthstatistics.com
- Click on Public Health in grey at top



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Navigating County of San Diego Web Public Health Services



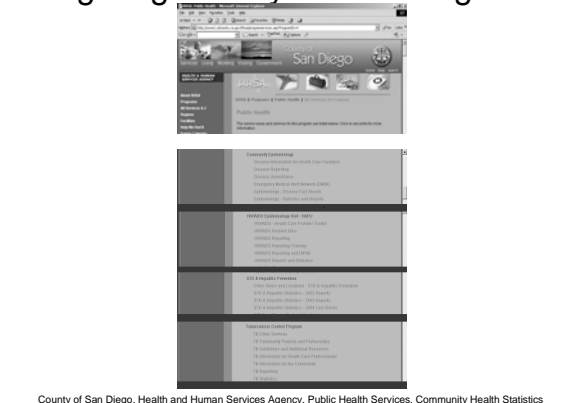
Select
"View All
Services"

Navigating County of San Diego Web Full listing of all Public Health Services web pages

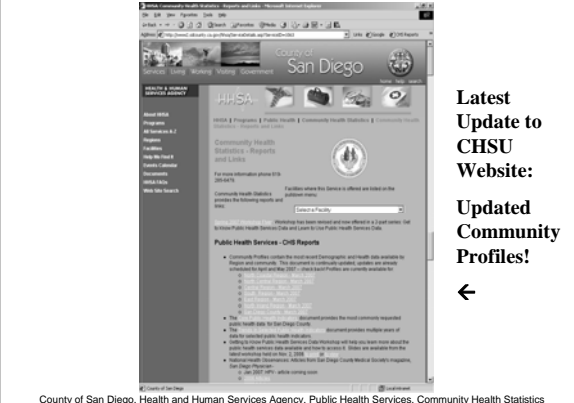


Scroll down
to find the
webpage
you want...

Navigating County of San Diego Web



Community Profiles



Latest
Update to
CHSU
Website:
Updated
Community
Profiles!
←

Community Profiles

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Important Information for Data Users

Please Review This Section Before Using the Following Public Health Data

For abbreviations used in data sources, see [Data Sources](#).

Diagnoses:

Disease definitions for most indicators are based on ICD-CM coding. Two versions of ICD coding are used in this document depending upon the data source, ICD-9 or ICD-10. ICD-CM based data for San Diego is comparable whether obtained using the 9th or 10th version; codes used are listed in footnotes for appropriate tables. Healthy People 2010, USA, California data are shown if available and comparable to local data; definitions for these can be found via [Healthy People 2010 Operational Definitions](#).

The death data used in this document only include underlying cause of death. That means that deaths are categorized only by the disease or injury that initiated the chain of events leading to death and not by the immediate cause or any other contributing cause. For example, a diabetic who died of heart disease resulting from complications of diabetes would only be included among diabetes-related deaths. Similarly, Hospital Discharge and Emergency Department Discharge data is reported by the primary diagnosis at time of discharge for which the medical encounter occurred. In some cases, indicators are based on case definitions; meeting specified clinical and/or laboratory criteria not ICD-CM coding.

Comparing Data:

Caution must be used when exploring data from multiple sources or even the same data prepared by different analysts; comparisons may not be appropriate. Attention to accompanying information is important in order to note differences including, but not limited to, data source, data representation, diagnostic case definitions, rate concept (i.e., per 100,000 population), and other factors.

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North Coastal Profile North Coastal Region Demographic Data

Demographic Profile (2006 Estimates)

Category	Number	Percent
Total Population	95,582	100.00%
Age Distribution		
0 to 4 Years	4,790	5.14%
5 to 14 Years	11,132	11.81%
15 to 24 Years	12,511	13.41%
25 to 34 Years	24,063	25.79%
35 to 44 Years	20,438	21.57%
45 to 54 Years	11,403	12.11%
Gender Distribution		
Male	45,947	48.11%
Female	49,635	51.89%
Race/Ethnicity		
White	72,503	77.66%
Hispanic	14,077	15.08%
Black	621	0.67%
Asian	3,706	3.94%
Other	2,855	3.02%

Household (HH) Income (2006 Estimates)

Category	Number	Percent
Total Households	37,094	100.00%
Household Income		
\$41,000	66,816	38.84%
\$45,000 to \$54,000	43,267	25.00%
\$55,000 to \$74,000	23,931	13.75%
\$75,000 to \$124,000	14,077	8.12%
\$125,000	25,711	14.89%

Unemployment Estimate (2006 Census)

Category	Number	Percent
Eligible Labor Force		
25+ Years	224,487	

Education (2000 Census)

Category	Number	Percent
Attended Education	284,300	
Completed Education		
< High School Graduate	14,893	
High School Graduate	18,799	
Some College or AA	33,914	
Bachelor Degree	30,505	
Graduate Degree	11,307	

School Enrollment (2000 Census)

Category	Number	Percent
Population Eligible for Enrollment	95,514	
School Enrollment (K-12)	30,384	
Private vs. Public School Enrollment		
Private Public Schools	30,434	
Private Private Schools	9,950	

Language (2000 Census)

Category	Number	Percent
Native Population	423,344	
Foreign Language Spoken at Home		
English Only	79,134	
Spanish Only	6,014	
Asian/Pacific Island Language Only	0,360	
Other Language Only	0,234	
Bilingual	20,222	

Housing Estimate (2000 Census)

Category	Number	Percent
Occupancy		
Owner Occupied	60,334	
Renter Occupied	38,874	

County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

CHSU Website: Community Profiles

Public Health Data Topic Page Index

Click on a topic to jump to that page

Health Outcomes

- Coronary Heart Disease.....
- Stroke.....
- Diabetes.....
- Asthma.....
- Cancer.....
- Infectious Disease.....
- Sexually Transmitted Disease.....
- Vaccine Preventable Disease.....
- Maternal & Child Health.....

Injury Outcomes

- Unintentional Injury.....
- Drowning.....
- Fire, Smoke, Flame Injury.....
- Suffocation.....
- Fall-related Injury.....
- Overdose/Poisoning.....
- Motor Vehicle Injury.....
- Pedestrian Injury.....
- Intentional Injury.....
- Furcous Injury.....

Other

- Dental.....

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San Diego County - Public Health Data

Coronary Heart Disease

Healthy People 2010 Target: 168 heart disease deaths per 100,000 age adjusted population¹
 USA: 172 deaths per 100,000 age adjusted population (2003)²
 California: 176 deaths per 100,000 age adjusted population (2003)²

Year	North Coastal	North Coastal	Central	South	East	North Island	Unknown ³	County	County age	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	adjusted rate	
2000	959	143.1	863	155.9	723	148.4	969	173.6	159.2	155.1
2001	893	140.3	790	150.6	651	133.2	840	163.1	159.8	155.1
2002	973	139.3	854	123.4	876	138.9	931	155.1	159.4	155.1
2003	871	137.3	861	115.1	800	122.9	896	148.4	159.4	155.1
2004	830	125.9	898	117.4	800	122.7	896	148.4	159.4	155.1

¹ Rates per 100,000 population. Age Adjusted Rates per 100,000 2000 US standard population.
² Coronary Heart Disease death rates per 100,000 males 15-124,000.
³ Source: National Vital Statistics System, CDC, NCHS. Online database accessed 12/20/06. <http://www.cdc.gov/nchs/data/tables.htm>
⁴ Rates not calculated for fewer than 10 events. Rates not calculated in cases where the denominator is zero or unknown.
 Source: State of CA, CHS, County of San Diego, Health & Human Services Agency, Community Epidemiology, Death Statistics/Injury Files, SANDAG, Current Population Estimates, 9/2/06.
 Prepared by County of San Diego (CHS), Health & Human Services Agency (HHSA), Community Health Statistics, 12/12/06.

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North Coastal Region
CMS Patient Care Clinics

North Coastal Region
Medical Hospitals

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Community Profiles

Future data updates

- SRA level health data
- CHIS, YRBS data
- other data: air quality, violence
- Detail: age, Race/Ethnicity, gender

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Questions?

- Evaluations – please fill out!
- Questions???

Contact Information
 Community Health Statistics Unit
 6255 Mission Gorge Road
 San Diego, CA 92120
www.sdhealthstatistics.com
 Data Requests (619) 285-6479

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